Is Postrenal Acute Renal Failure Possible in the Absence of Hydronephrosis?

Hidronefroz Olmadan Postrenal Akut Böbrek Yetmezliği Olabilir mi?

ABSTRACT

Acute renal failure (ARF) is a clinical situation that renal functions deteriorate suddenly within hours to days. Postrenal causes are responsible for a small part of ARF. In this article, we presented a case gone to left nephrectomy priorly, with a right ureter stone led to complete obstruction, ARF, and treated by ureterorenoscopy (URS). A seventy year old male patient was sent to Emergency Department because of anuria for 48 hours. In ultrasonographic exam; there wasn't hydronephrosis of right kidney. A right lower ureter stone was seen in the non-contrast spiral abdominal computed tomography. The lower ureter stone was removed by URS and JJ catheter was replaced. He was discharged with normal renal function tests. In conclusion, postrenal ARF must be ruled out in patients with acute anuria, especially zero urine, even if hydronephrosis delinea. If postrenal ARF is diagnosed and treated quickly, the outcomes will be excellent.

KEY WORDS: Acute renal failure, Non-dilated obstructive uropathy, Ureterorenoscopy

ÖZ

Akut böbrek yetmezliği (ABY) böbrek fonksiyonlarının saatler veya günler içinde hızlıca bozulduğu bir klinik durumdur. Postrenal sebepler ABY'nin küçük bir kısmından sorumludur. Bu yazıda, daha önce sol nefrektomi geçiren, sağ üreter taşının sebep olduğu obstrüksiyon, ABY ve üreterorenoskopi (URS) ile tedavi edilen bir olguyu sunduk. 70 yaşında erkek hasta 48 saattir idrar çıkışının olmaması nedeniyle acil servise gönderilmişti. Ultrasonografik muayenede sağ böbrekte hidronefroz yoktu. Non-kontrast spiral abdominal bilgisayarlı tomografide sağ alt üreter taşı görüldü. Alt üreter taşı URS ile çıkartılarak JJ kateter yerleştirildi. Hasta normal böbrek fonksiyonları ile taburcu edildi. Sonuç olarak; hidronefroz olmasa bile akut anüri durumunda özellikle idrar çıkışı hiç yoksa postrenal ABY ekarte edilmelidir. Postrenal ABY hızlıca teşhis ve tedavi edilirse sonuç mükemmeldir.

ANAHTAR SÖZCÜKLER: Akut böbrek yetmezliği, Non-dilate obstrüktif üropati, Üreterorenoskopi

Mustafa YAPRAK[1]
Mehmet Nuri TURAN[1]
Abdulkerim Furkan TAMER[1]
Erhan TATAR[1]
Alev GARİP[2]
Fuad İSMAYILOV[3]
Halil BOZKAYA[4]
Ceyhun ÖZYURT[3]
Meltem SEZİŞ DEMİRCİ[1]

1 Ege University Faculty of Medicine, Department of Internal Medicine, Division of Nephrology, İzmir, Turkey
2 Ege University Faculty of Medicine, Department of Internal Medicine, İzmir, Turkey
3 Ege University Faculty of Medicine, Department of Urology, İzmir, Turkey
4 Ege University Faculty of Medicine, Department of Radiology, İzmir, Turkey

INTRODUCTION

Acute renal failure (ARF) is a clinical situation that renal functions deteriorate suddenly within hours to days (1). It can be classified mostly as prerenal, renal and postrenal according to etiology. Prerenal, renal, and postrenal causes are responsible for 50-70%, 20-40%, 5% of ARF, respectively (2). If postrenal ARF isn't diagnosed and treated properly, it can cause end stage renal disease (ESRD) (3). Therefore, early diagnosis and treatment of postrenal causes have critical role in the recovery of ARF. In this article, we presented a case gone to left nephrectomy priorly, with a right ureter stone led to complete obstruction, ARF, and treated by ureterorenoscopy (URS).

CASE

A seventy year old male patient was followed for 48 hours because of abdominal pain and anuria in another hospital. He was referred to our hospital Emergency Department due to unclear etiology and need of hemodialysis (HD). In his medical history, he was performed left nephrectomy

Received : 01.08.2013
Accepted : 14.11.2013

Correspondence Address:
Mustafa YAPRAK
Ege Üniversitesi Tıp Fakültesi,
İç Hastalıkları AD, Nefroloji BD,
İzmir, Turkey
Phone : +90 505 572 56 67
E-mail : mustafayaprakdr@yahoo.com

due to trauma 30 years ago. There were neither any known chronic illnesses nor any drug intake recently. In his physical exam; blood pressure was 150/90 mmHg. Lung auscultation showed bilateral basal crackles. Cardiac auscultation was normal. Defense, rebound and tenderness were not detected in abdominal examination. Furthermore there was no costovertebral angle tenderness. Mild pretibial pitting edema (1+) was found bilaterally. Laboratory results showed urea 160 mg/dl, creatinine 8,38 mg/dl, sodium 140 meq/l, potassium 5,0 meq/l, calcium 7,4 mg/dl, and chloride 95 meq/l. He had Foley catheter without any urine output. Renal doppler ultrasound revealed as follow; left kidney was not visualized. The right kidney was 14.1 cm, mean parenchymal thickness was 16 mm and cortical echogenity was normal. There were no solid mass, stone or hydronephrosis. There wasn't significantly increased flow velocity of right renal artery. Ultrasound examination did not provide any evidence for ARF etiology. He went on only one HD session due to hypervolemia and metabolic acidosis in blood gases.

Although there was no hydronephrosis on ultrasound imaging, previous abdominal pain and renal failure with anuria (''zero'' urine) in a solitary kidney patient made us to think that the diagnosis would be the right lower ureteral stone. Non-contrast spiral abdominal computed tomography (CT) was performed after 5 hours. Right lower ureteral stone was detected in CT (Figure 1). In Urology Department, ureteral stone was removed by URS method and JJ catheter was inserted. After procedure, Intravenous (IV) 1500 ml of 0,9 % saline was given while his urine output was 8000 ml on the first day. He didn't receive parenteral fluid on the 2nd postoperative day as his urine output was 4000 ml (Table I). He was discharged from the hospital with normal renal function tests; urea 53 mg/dl and creatinine 0.83 mg/dl on the 3rd postoperative day.

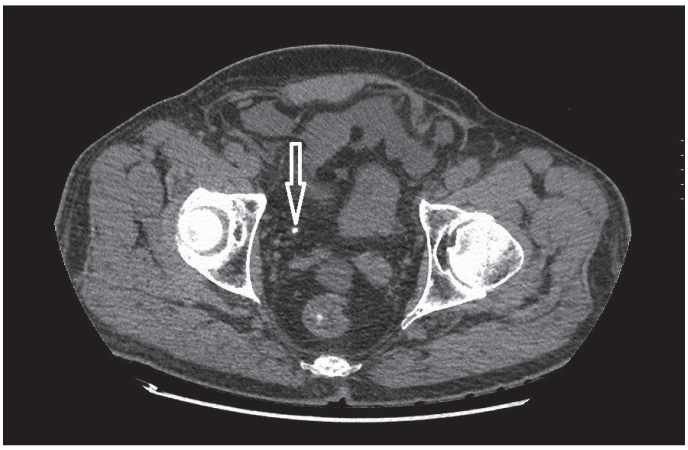

Figure 1: *Noncontrast Abdominal CT Image (5 mm of the right lower ureter stone-arrow).*

DISCUSSION

Acute renal failure can result from various etiologic factors. Among these factors, prerenal causes such as vomiting, dehydration or bleeding, renal causes like nephritic syndrome, acute tubular necrosis and obstructions arising from any level of urinary system (postrenal causes) can be listed (4). Though postrenal causes have a little ratio among the causes of ARF, when the causative factor is eliminated, results are satisfactory in postrenal ARF (5). Our case had single kidney, and complete obstruction due to 5 mm stone was detected in the lower ureter. It was removed by URS process and then JJ catheter was inserted. Urine output was maintained by these procedures and his renal function returned to normal values within 48 hours.

Mostly, clinicians don't suspect from postrenal ARF unless hydronephrosis is present. But postrenal ARF may be without hydronephrosis in 3 circumstances (6). Firstly, in the early stage of obstruction, hydronephrosis can not be determined; because it takes a certain time such as 1-3 days. Secondly, in retroperitoneal fibrosis, postrenal ARF can be seen without hydronephrosis. Lastly, if there is mild obstruction, hydronephrosis may not be seen. Therefore, in anuria, especially zero urine output, postrenal ARF must be ruled out even if hydronephrosis delinea (7). The syndrome of non-dilated obstructive uropathy (NDOU) and ARF was previously described (8). The most suitable imaging technique for diagnosis of NDOU is non-contrast spiral abdominal CT (9). Although there was obstruction in our patient, hydronephrosis had not progressed yet. We insisted about the NDOU due to anuria (''zero'' urine) and found the lower ureter stone, and were able to treat him.

Catalano et al presented a case with anuria and ARF due to one sided ureteral stone although the patient had 2 functional kidneys (10). Whereas, there was complete obstruction in one ureter, there was no pathology in contralateral side. It was emphasized that the cause of ARF might be the reflex anuria

Table I: Monitoring and treatment of patient day by day.

Days	Urea*	Creatinine*	Intravenous fluid	Urine	Diuretic
Admission day	160	8,38	No	No	80 mg of furosemide
1st day	107	3,23	1500 ml isotonic	8000 ml	No
2nd day	53	0,83	No	4000 ml	No

* mg/dL

secondary to hyper excitability of autonomous nervous system leading to ureteral or vascular smooth muscle spasm. In our case, he had single kidney and ureter was totally occluded with a stone near the bladder entrance. Renal function returned to normal in a short time, by extracting the stone via proper method as soon as diagnosed.

Complete or long lasting partial obstruction of urinary tract may cause tubular atrophy and at last irreversible renal failure (3,11). It was thought that renal prognosis depended on severity and duration of obstruction, after it was relieved. It was emphasized that, although there was evidence for relative complete recovery of glomerular filtration rate (GFR) if total ureteral obstruction was relieved within the 1st week, when duration of obstruction exceeds 12 weeks, recovery decreased or no recovery occurred (3). In a study of rats, it was shown that 15% decrease in the number of nephrons whereas no change in GFR after total ureteral occlusion of 24 hours. Here, unaffected GFR was explained with compensatory hypertrophy of other glomerulus (12). Therefore, in total ureteral obstruction, the earlier relieving of obstruction would lead the least nephron loss, although GFR isn't affected. We diagnosed and treated our patient within 24 hours. But he had a follow up of 48 hours in another center before coming to our clinic. Thus, his obstruction had been relieved within 72 hours from the beginning and renal functions returned to normal within 48 hours.

There are two commonly mistakes in urinary tract obstructions about urinary output (13). The first one is the attitude that patient must be oliguric or anuric during the obstruction period. However, polyuria can also be seen in partial obstructions. The second mistake is the idea that lost volume must be replaced during post obstructive diuresis. After relieving of urinary obstruction, urine output can exceed 500-1000 ml per hour at beginning. Polyuria is an expected condition secondary to the effort of fluid output, accumulated during the occlusive period (14, 15). As a result, attitude of replacing all volume lost by urine will cause persistent volume overload and lead to urinate more than 10 L per day. Thus, in our case diuresis was 8000 cc on the 1st day, 4000cc on the 2nd day after operation. Our patient was conscious and well cooperated in postoperative period, 1500 cc IV isotonic was given in addition to oral intake. We didn't give any parenteral fluid on the 2nd day. He was advised to drink when felt thirsty.

In conclusion, postrenal ARF must be ruled out in patients with acute anuria, especially zero urine, even if hydronephrosis delinea. Non-contrast spiral abdominal CT is the most suitable tool for diagnosis of these cases. If postrenal ARF is diagnosed and treated quickly, the outcomes will be excellent.

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